

## REMARKS

### I. Status of the Claims

Claims 3-5, 7-8, 10-12, 15-17, 19, 20, 22-23, 25, 28-30, 33, 34, and 37-41 are pending in the application. Independent Claims 7, 16, 20, and 37-41 have been amended to specify an amount of water-soluble dye in the ink composition, and sufficient fat- or wax-dispersible carrier to dissolve the dye, which is believed to address the Examiner's rejection under 35 U.S.C. § 112, second paragraph. Claims 1, 2, 6, 9, 13-14, 18, 21, 24, 26, 27, 31, 32, 35 and 36 have been cancelled.

The limitation that the dye is dissolved in the carrier finds support throughout the application, for example, at paragraph [0036] of the published application. The lower limit for the amount of dye in the composition is taken from Example 9 of Table 2, which is at page 4 of the published application. No new matter has been added. Applicants respectfully request reconsideration of the outstanding rejections in view of the foregoing amendments and the following remarks.

### II. Amendment to the Specification

Original paragraph [0026] incorrectly refers to the weight percentage of FD&C dye with respect to the ink composition. This paragraph should refer instead to the weight percentage of dye in the carrier, and weight percentage of dye-plus-carrier with respect to the ink composition. This reflects the values in the right hand column of Table 2.<sup>1</sup> Applicants respectfully submit that both the error, and its correction, would

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<sup>1</sup> Exhibit A shows the amounts of dye, carrier, dye-plus-carrier, and wax base in the composition, in percent by weight of the final composition, as well as the amount of dye in the dye-plus-carrier solution, in percent by weight of the dye-plus-carrier solution, calculated for the examples of Table 2. To obtain the amount of dye in the dye-plus-

have been apparent to one of ordinary skill in the art, referring to Table 2, and respectfully request entry thereof.

III. Rejection Under 35 U.S.C. § 112, Second Paragraph

Applicants submit that the 35 U.S.C. 112, second paragraph, rejection is moot in view of the foregoing amendments. The Examiner correctly observes that the Examples were prepared using a saturated solution of dye in carrier. Aliquots of those solutions may then be used to make an ink composition. Note the difference between this procedure and the procedure described in Reitnauer paragraph [0032], ("[t]he inks generally are prepared by combining all of the ink ingredients except for the colorant . . . . [The colorant] is then added to the mixture with stirring").

IV. Rejections Over Prior Art

All of the claims have been rejected over U.S. Patent Application Publication No. 2003/0101902 A1 (hereinafter "Reitnauer"), in view of U.S. Patent No. 6,450,615 B2 (hereinafter "Kojima"), for the reasons of record. Applicants respectfully traverse.

V. Arguments

The present invention is directed to an edible ink. The ink contains water-soluble FD&C dye. In order to disperse the water soluble dye in the fat or wax base, the dye is dissolved in a fat or wax dispersible carrier for the colorant, such as glycerin

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carrier solution of Example 1, for example, 6 grams of dye is divided by the weight of 200 ml of carrier plus the weight of the dye. To obtain the weight percentage of dye in the final product, the weight of the 10 ml dye-plus-carrier aliquot is divided by the weight of the aliquot plus the weight of the wax base, then multiplied by the fraction of dye in the dye-plus-carrier solution. These calculations assume that the density of a saturated solution of dye-plus-carrier is approximately the same as the density of carrier, which is reasonable in light of the practice in the art.

and/or propylene glycol. As amended, the claims recite that the ink composition contains at least 0.09 percent by weight dye. This is the least amount of dye used in any of the operative examples of the invention described in Table 2, and requires, for example, 8.52 percent by weight of propylene glycol carrier to dissolve the dye and disperse the same in the wax base (see Example 9 of Table 2). Where more of the same dye is used, even more carrier is required, as shown in the other examples.

Reitnauer mentions glycerin and propylene glycol as processing aids, and one of ordinary skill in the art would understand that these processing aids would be used, if at all, in minor amounts. As claimed in the present invention, the carrier is present in an amount effective to dissolve the colorant. Note that according to the Examples of Table 2, this requires a minimum of 7.85 percent by weight carrier in the composition (Example 16) to 36.57 percent by weight carrier (Example 6), which is far more propylene glycol or glycerin than would be used as a processing aid, and therefore is far more carrier than would be present in any composition according to Reitnauer. Also, note that the least amount of carrier is the amount required to dissolve the dye. As dye is provided in an amount up to the solubility limit of the carrier, more carrier may be present in the composition.

Reitnauer does not teach a water-soluble colorant dissolved in a fat or wax dispersible carrier for the colorant. Although the Reitnauer specification discloses FD&C dyes, Reitnauer does not describe how to disperse such a water soluble dye in a wax based ink. Reitnauer does not disclose a water-soluble colorant in a wax or fat dispersible carrier for the colorant or a corresponding method of making. The examples in Reitnauer teach a lipid soluble colorant dissolved in fat being mixed in a wax base.

That is, the wax based inks disclosed in Reitnauer contain a wax soluble colorant. In each of the Examples, the colorant is apocarotenal, a water insoluble dispersion in medium chain triglycerides (MCT). Although there is a list of dyes and pigments, including some water-soluble colorants, at paragraph [0025], Reitnauer does not teach how to disperse a water soluble colorant into a fat or wax base using a carrier for the colorant, and under the case law, the proposed combination cannot be said to be obvious, without an obvious way to make it. One of ordinary skill in the art would not expect one of the water soluble dyes listed in Reitnauer to be disperble into a wax base using the methods described in the Examples of Reitnauer.

It would not have been obvious to provide a combination of glycerin, for example, and colorant, in the amount stated in the present claims, based on the disclosure in Reitnauer, because Reitnauer does not disclose that glycerin serves as a carrier for a water-soluble food coloring in a wax base. Reitnauer discloses a wax soluble colorant distributed in a wax-based ink. (Applicants' remarks from previous responses in this regard are incorporated herein by reference.)

The Examiner argues at page 6 of the Office Action that "once the components of the ink composition have been combined, including the glycerin . . . all the components are part of the carrier for the colorant." This argument is overcome by amendment, because the claims require sufficient carrier to dissolve the dye. Moreover, the claims require a carrier that can be dispersed in the wax base, so that all of the ingredients of the ink composition cannot be construed as a "carrier" for the dye. Reitnauer does not disclose components present in an amount to dissolve a water-soluble dye such that the dye can be dispersed in a wax.

The ingredients in the Reitnauer composition are fully disclosed: wax is present in an amount of 50 percent by weight to 99 percent by weight (paragraph [0019]); resin, such as Foral 85 hydrogenated resin (generally required in the Reitnauer composition, and not recited in the present claims), is present in an amount of 0 to 50 percent by weight (paragraph [0022]). Colorant (such as the wax-soluble apocarotenal used in all of the Examples) is present in an amount of 0.1 to 20 percent by weight (paragraph [0026]). The remaining ingredients are present in minor amounts, including stabilizer (such as BHA or BHT), present in an amount of 0.1 to 2 percent by weight, and processing aids such as flexibilizers and plasticizers. It is unreasonable, in light of this disclosure, to suggest that the incidental mention of glycerin in Reitnauer at paragraph [0031] renders obvious the presence of sufficient carrier to dissolve an ink colorant.

Reitnauer does not teach one of ordinary skill in the art how to disperse a water soluble colorant in a fat or wax base to make an ink. The case law makes clear that absent some known or obvious way to make a composition, the composition is not in the possession of the public. *In re Hoeksema*, 158 U.S.P.Q. 596 (C.C.P.A. 1968), *see also* the *In re Payne* and *Beckman Instruments* cases cited by applicants in the previous response. Therefore, Reitnauer does not make obvious a composition merely by listing a component, such as glycerin, where there is no obvious way to use it in an appropriate amount to dissolve the water-soluble dye and disperse it in a wax base.

The present specification is clear as to the technical challenge posed, for example, at paragraph [0025] (“one technical challenge is to ensure the dispersion of the colorant in the fat or wax base”), and in paragraph [0029] (“as the FD&C dyes and

natural colorants are water soluble, solubilizing the dyes in a carrier that is compatible with a wax poses a significant technical challenge.”)

The specification is also clear regarding the requirements of a good carrier in paragraph [0033], including the requirement for the solubility of the colorant in the carrier. The important characteristics of the carrier system are that it be able to dissolve the colorant and that it disperses in the fat phase. The specification states, for example, that, preferably, FD&C colorant is soluble in the carrier at least to the extent of 1 gram per 100 ml, more preferably greater than 5 grams per 100 ml and most preferably greater than about 18 grams per 100 ml. Polyols have a good balance of fat dispersibility and solvating ability for most of the colorants. Reitnauer has no corresponding disclosure such that it can be said the claimed invention is “obvious.” Reitnauer instead teaches the combination of materials that are all lipophilic and, therefore, soluble in each other – lipid-soluble colorant in fat, and fat in wax.

Moreover, whereas Reitnauer teaches taking a lipid-soluble colorant dissolved in fat and combining it with a wax, the present specification explains the process step of dissolving a water-soluble colorant in a fat or wax dispersible carrier for the colorant, then dispersing the colorant-plus-carrier solution into the fat or wax base: “The colorant is dissolved or dispersed in the carrier, which is then dispersed into the fat or wax phase.” (Paragraph [0033]).

In summary, Reitnauer does not disclose a water-soluble colorant in a wax or fat dispersible carrier for the colorant or a corresponding method of making. The wax based inks disclosed in Reitnauer contain a wax soluble colorant. Although there is a list of dyes and pigments, including some water-soluble colorants, Reitnauer does not teach

how to disperse a water soluble colorant into a fat or wax base using a carrier for the colorant, and under the case law, the proposed combination cannot be said to be obvious, without an obvious way to make it.

Kojima, on the other hand, merely teaches properties of hot melt inks, including a viscosity in the range of 8-15 cP, a surface tension in a range of 10 and 70 dynes/cm, and apparently in some cases, an image resolution achieved of 300 dpi.<sup>2</sup> Kojima does not teach that printing can be performed on an edible substrate, such as a sugar shell confectionery, or that edible inks can be formulated to meet the requirements of the disclosed printhead. In particular, Kojima does not disclose compatibility of an edible wax based ink for a wax polished sugar shell surface, characterized by a contact angle, for example. Neither reference provides the motivation to make the asserted combination, adapting edible inks as purportedly disclosed in Reitnauer for use with the printing apparatus of Kojima.

#### CONCLUSION

Applicants respectfully submit that the independent claims are allowable over the prior art of record for the reasons stated above. Each of the remaining claims, not specifically discussed above, including the dependent claims, incorporates one or more of the limitations discussed above, and should be found allowable over the art of record, for at least the reasons discussed above. Careful reconsideration of each claim, including each dependent claim, is respectfully requested.

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<sup>2</sup> Note that Reitnauer's examples teach an ink viscosity of 22.4 at 135° C (See Examples 3 and 4, paragraph [0044]). Thus Reitnauer is both outside the claimed range, and incompatible with Kojima.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

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# **EXHIBIT A**

Example No.	Dye Type	Colorant Carrier	Amount of Dye	Vol. of Colorant Carrier	Vol. of Solution (mL)	Type of Base	Amount of Fat (g)	Carrier Density (g/mL)	Wt% Dye plus-Carrier Solution in Final Product	Wt% Dye in Dye-plus-Carrier Solution	Wt% Carrier in Final Product	Wt% Fat or Wax Base in Final Product
1	Red #40	Propylene Glycol	6 g	200 mL	10	Wax	110	1.04	8.6	2.81	0.24	8.37
2	Red #40	Propylene Glycol	6 g	200 mL	15	Wax	110	1.04	12.37	2.81	0.35	12.03
3	Red #40	Propylene Glycol	6 g	200 mL	20	Wax	110	1.04	15.85	2.81	0.45	15.40
4	Red #40	Glycerin	3 g	400 mL	20	Wax	110	1.28	18.87	0.58	0.11	18.77
5	Red #40	Glycerin	3 g	400 mL	30	Wax	110	1.28	25.87	0.58	0.15	25.73
6	Red #40	Glycerin	3 g	400 mL	50	Wax	110	1.28	36.78	0.58	0.21	36.57
7	Red #3	Propylene Glycol	30 g	300 mL	30	Wax	110	1.04	22.03	8.80	1.94	20.09
8	Red #3	Propylene Glycol	30 g	300 mL	50	Wax	110	1.04	32.01	8.80	2.82	29.20
9	Yellow Blend	Propylene Glycol	4.4 g	400 mL	10	Wax	110	1.04	8.607	1.05	0.09	8.52
10	Yellow Blend	Propylene Glycol	4.4 g	400 mL	15	Wax	110	1.04	12.37	1.05	0.13	12.25
11	Yellow Blend	Propylene Glycol	4.4 g	400 mL	20	Wax	110	1.04	15.85	1.05	0.17	15.68
12	Yellow Blend	Propylene Glycol	4.4 g	400 mL	30	Wax	110	1.04	22.03	1.05	0.23	21.80
13	Yellow Blend	Propylene Glycol	4.4 g	400 mL	50	Wax	110	1.04	32.01	1.05	0.34	31.68
14	Blue #1	Propylene Glycol	30 g	300 mL	30	Wax	110	1.04	22.03	8.80	1.94	20.09
15	Blue #1	Propylene Glycol	30 g	300 mL	50	Wax	110	1.04	32.01	8.80	2.82	29.20
16	Green #3	Propylene Glycol	40 g	400 mL	10	Wax	110	1.04	8.607	8.80	0.76	7.85
17	Green #3	Propylene Glycol	40 g	400 mL	15	Wax	110	1.04	12.37	8.80	1.09	11.29
18	Green #3	Propylene Glycol	40 g	400 mL	20	Wax	110	1.04	15.85	8.80	1.40	14.46

Example No.	Dye Type	Colorant Carrier	Amount of Dye	Vol. of Colorant Carrier Solution (mL)	Vol. of Sat. Solution (mL)	Type of Base	Amount of Fat (g)	Carrier Density (g/mL)	Wt% Dye-plus-Carrier Solution in Final Product	Wt% Dye in Dye-plus-Carrier Solution in Final Product	Wt% Carrier in Final Product	Wt% Fat or Wax Base in Final Product
19	Red Lake	Glycerin	5 g	100.13 g	30	Wax	108	1.28	26.22	4.76	1.25	24.98
20	Red #3/TiO2	Propylene Glycol	30 g	400 mL	30 mL each	Wax	167	1.04				
21	Red Lake	Propylene Glycol	5 g	100.12 g	30	Wax	110	1.04	22.03	4.76	1.05	20.98
22	Red #3/Tween	Propylene Glycol	30 g	400 mL		Wax	110	1.04	22.59			
23	Annatto 406	NA	30 mL	NA	30	Wax	114					
24	Annatto 406/TiO2	NA	10 mL	NA	with TiO2	Wax	122					
25	Annatto Wesson 3190	Oil	40 mL	215 g	30	Wax	109					
26	TiO2	Oil Base			30	Wax	109.6					
27	Green #3	Propylene Glycol	40 g	400 mL	30	Cocoa Butter	301.3	1.04	9.35	8.80	0.82	8.53
28	Green #3	Propylene Glycol	40 g	400 mL	30	Wesson ® Oil	299.9	1.04	9.39	8.80	0.83	8.56
29	Green #3	Propylene Glycol	40 g	400 mL	30	Butter	303.3	1.04	9.29	8.80	0.82	8.48
30	Green #3	Propylene Glycol	40 g	400 mL	30	Butinol	303.4	1.04	9.29	8.80	0.82	8.47
31	Green #3	Propylene Glycol	40 g	400 mL	30		300.9	1.04	9.36	8.80	0.82	8.54
32	Green #3	Propylene Glycol	40 g	400 mL	30		275	1.04	10.15	8.80	0.89	9.26
33	Green #3	Propylene Glycol	40 g	400 mL	30	Caplex® 300	301.1	1.04	9.35	8.80	0.82	8.53
												Range = 8.6 - 36.78 wt%
												Range = 0.58 - 8.80 wt%
												Range = 0.09 - 2.82 wt%
												Range = 36.57 - 91.39 wt%
												Range = 63.22 - 90.64 wt%